

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

READING

ASB599

A2452

1971

progress
report

U. S. DEPT. OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY

MAR 18 1977

CATALOGING - PREP.

PLANT PROTECTION AND QUARANTINE PROGRAMS

Animal and Plant Health Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

634069

This publication reports research involving pesticides. It does not contain recommendations for their use, nor does it imply that the uses discussed here have been registered. All uses of pesticides must be registered by appropriate State and/or Federal Agencies before they can be recommended.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife—if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.



Use Pesticides Safely
FOLLOW THE LABEL

U.S. DEPARTMENT OF AGRICULTURE

Trade names are used in this publication solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture or an endorsement by the Department over other products not mentioned.

October 1972

CONTENTS

	<i>Page</i>
Introduction	1
Barberry eradication	1
Black Grass Bugs	2
Boll Weevil	2
Boll Weevil eradication trial	3
Burrowing Nematode	3
Caribbean Fruit Fly	3
Cereal Leaf Beetle	3
Citrus Blackfly	5
European Chafer	6
European Crane Fly	6
Giant African Snail	7
Golden Nematode	7
Grasshopper and Mormon Cricket	8
Gypsy Moth	9
Imported Fire Ant	11
Japanese Beetle	11
Khapra Beetle	12
Mediterranean Fruit Fly	12
Mexican Fruit Fly	12
Oriental Fruit Fly	12
Peach Mosaic	13
Phony Peach	13
Pink Bollworm	13
Range Caterpillar	15
Soybean Cyst Nematode	15
Sweetpotato Weevil	16
West Indian Sugarcane Root Borer	16
Whitefringed Beetle	16
Witchweed	17
Pest management	17
Insect survey and detection	18
Appendix tables	20

1971 PROGRESS REPORT

PLANT PROTECTION AND QUARANTINE PROGRAMS

INTRODUCTION

For many years there has been consideration of separating the regulatory agencies from the Agricultural Research Service. This finally occurred with the announcement on November 1, 1971, when the plant and animal divisions became the Animal and Plant Health Service. With this separation, close liaison will still be maintained with the Agricultural Research Service so that the regulatory programs will have the necessary research support.

The transition involves a tremendous amount of work and coordination; however, it is moving along quite smoothly. There have been delays due to Secretary Butz' announcement on January 19, 1972, which involved the transfer of meat and poultry inspection to the new Service which is now known as the Animal and Plant Health Inspection Service. Dr. Francis J. Mulhern, who had been the Associate Administrator of the Agricultural Research Service, was named the Administrator of the new Agency. Plant Protection and Quarantine Programs is now functioning under Mr. Leo G. K. Iverson who is one of five Deputy Administrators in the new Service. The addition of meat and poultry inspection added about 8,000 employees. It was after July 1, 1972, before we were functioning effectively as a single organization. When Animal and Plant Health Inspection Service is in full operation it will be the second largest Agency in the U.S. Department of Agriculture.

Plant Protection has been charged with the responsibility of measuring residue levels, which may result from operational pest control programs, as they occur in the natural environment. In line with this charge, programs are being developed which will correlate residue levels with discrete and gross changes in the environment.

Action was taken to increase our "in-house" training capabilities by assigning an employee full time to a position at an Agency training facility in Battle Creek, Mich. With the establishment of the new training facility will come an increase in training which is specifically directed to the needs of Plant Protection and Quarantine employees.

BARBERRY ERADICATION

There are 19 important grain-growing States cooperating in the barberry eradication program. The initial barberry survey has been completed in 16 of these States. During the year, 1,427,964 barberry plants were destroyed. In 1971, 451 square miles of initial surveys were completed, 1,113 square miles of rework accomplished, and 1,013 square miles of area placed on maintenance. At the end of 1971, the total area on maintenance was 1,058,424 of the 1,073,000 square miles originally scheduled for work. Regulatory inspections were made at 1,456 nurseries handling approved varieties of ornamental barberry and mahonia plants.

A review of the barberry eradication programs in Colorado, Virginia, and West Virginia resulted in increased attention to destroying rust-susceptible barberry plants in areas of important grain acreage. This concentration of efforts should eliminate the barberry bushes that are an immediate source of stem rust.

Severe drought during the early part of 1971 throughout much of the South greatly reduced rust development. Traces of stem rust were noted in scattered locations in Kansas and Nebraska during late May and mid-June. The earliest collections of stem rust from North Dakota and South Dakota were made in late June and early July. Resistant varieties prevented any significant stem rust losses in the spring wheat areas. Oat stem rust occurred throughout the major oat-growing areas in 1971, though only in trace amounts.

BLACK GRASS BUGS

Since 1968, the grass bug complex of *Labops* spp. and *Irbisia* spp. has become damaging to rangeland reseeded to wheatgrass. Surveys in 1971 revealed spotted infestations. Economic infestations were not found on public lands, and no Federal treatments were necessary. A total of 4,000 acres of privately owned rangeland in Kane County, Utah, was treated by the owner using 8 ounces ultralow-volume (ULV) malathion per acre.

A 2-year grant to work on black grass bugs has been given to the Agricultural Experiment Station, Utah State University of Agriculture and Applied Science, Logan, Utah, by the Entomology Research Division, Agricultural Research Service, U.S. Department of Agriculture. The work started July 1, 1972, and amounts to \$10,000 per year. The work will be under the direction of a professor of entomology at the university.

BOLL WEEVIL

In the fall of 1971, approximately 133,232 acres on the Texas High Plains were treated with malathion an average of three times. The northern half of the area was treated on an "as needed" basis rather than on a regular schedule. Teams of scouts surveyed the fields once a week to keep current on the information records.

The aggregate acreage, about 400,000 acres, treated during the 1971 season, was one-third of the aggregate acreage treated in 1970. This can be attributed to the good results obtained in this program in the past several years, the new pest management technique of treating when and as needed, and to an assist from the weather which was detrimental to boll weevil development.

It was adequately demonstrated in 1970 that the systemic insecticide aldicarb could be used safely with no adverse effects on the crop or to wildlife. In 1970, the test fields were completely treated. In 1971, no less than four rows and no more than 20 rows of each field were treated with aldicarb on those sides of the field adjacent to the better boll weevil hibernation quarters. The plan is to obtain greater acreage protection from fewer acres treated.

The use of aldicarb under the new technique, combined with selective fall diapause treatments with malathion and the pretreatment survey, will combine to provide effective control with fewer treatments with insecticides.

BOLL WEEVIL ERADICATION TRIAL

The boll weevil eradication trial was initiated in July 1971 on approximately 24,000 acres of cotton in 50 counties in south-central Mississippi and adjacent areas of Alabama and Louisiana. In the fall diapause phase, multiple applications of malathion and/or azinphosmethyl were applied to infested cotton in the eradication and buffer zones of the trial area. This work is being conducted by a special team of Plant Protection personnel in cooperation with other Federal and State agencies and industry. The program integrates a series of population suppression techniques which include diapause control treatments and cultural practices in the fall and, with concentrated trapping, a single pesticide application and sterile insect release in the spring.

A boll weevil rearing facility was established at Gulfport, Miss. Rearing techniques are being refined, and sterilization studies are being conducted in preparation for the sterile male release phase of the program which will be initiated in 1973. A new mass-rearing facility is under construction at State College, Miss.

BURROWING NEMATODE

In 1971, policy changes adopted by the citrus industry's Spreading Decline Committee, were designed to encourage private enterprise to participate more in the program. There will be a gradual assumption of the cost for survey and maintenance of buffer zones and the push and treat from the State and U.S. Department of Agriculture to the citrus grove owners who receive the benefits. The transition will evolve gradually to enable growers to continue the program successfully.

During calendar year 1971, detection surveys were conducted on 38,007 acres, and other surveys including barriers were conducted on 31,374 acres. The laboratory processed 137,249 root samples. Initial infestations were found on 481 acres, and 274 acres were pushed and treated. About 35,000 lineal feet of chemical barriers were established, and 1,586,689 lineal feet of barriers were maintained.

CARIBBEAN FRUIT FLY

A test was initiated in cooperation with the Division of Plant Industry, Florida Department of Agriculture and Consumer Services, the University of Florida, and Entomology Research Division (ENT), Agricultural Research Service, to determine the feasibility of the sterile fly release in eliminating populations of the Caribbean fruit fly. The test site was Key West, Fla. Rearing methods were developed by the University of Florida at their laboratory in Homestead. The flies were irradiated in the Entomology Research Division's Caribbean Fruit Fly Laboratory in Miami. Evaluation of test results was carried out by the Florida Division of Plant Industry. Plant Protection developed the techniques for releasing adult flies by air in a freefall method. All air releases were made under contract by private operator. The initial work carried out by Plant Protection and subsequent releases indicate that the techniques developed were suitable. A spray program was initiated at Key West during the summer of 1971 in an effort to reduce the native fly population to a point where the sterile technique could be tested more effectively.

CEREAL LEAF BEETLE

Progress in biological control efforts against the cereal leaf beetle is rapidly being expanded. Three parasites have been released and have become established. These include an egg parasite, *Anaphes flavipes*, and two larval parasites, *Tetrastichus julis* and *Diaparsis carinifer*. A third larval parasite, *Lemophagus*

curtis, is under study. Thirty-seven field "insectaries" for mass production of parasites are planned for 1972 in the infested States to provide a source of parasites for mass release throughout the infested areas.

At the Methods Development Laboratory in Niles, Mich., 700,000 *Anaphes flavipes* parasites were reared and released on 109 sites in 50 counties in eight States. The egg parasite has been established in parts of Indiana, Michigan, and Ohio. This year, these parasites were released for the first time in Illinois, Kentucky, New York, and West Virginia. Previous releases have established the larval parasites in two counties in Michigan and one county in Ohio. In six States, 240,000 larval parasites were released this year.

The 1971 spring survey revealed 71 additional counties infested with cereal leaf beetle in seven States. The discovery of specimen in Walworth County, Wis., established a new State record. Of special importance was the westward migration of beetles to 28 new counties in Illinois and the location of an infestation in Chippewa County in the Upper Peninsula of Michigan.

Certain species of Christmas trees were found to be a potential source of cereal leaf beetle spread during the year. Through a crash methods program, treatments were developed that permitted certification of trees for movement to uninfested States. Over 1.7 million Christmas trees were treated and certified for shipment from the States of Illinois, Indiana, Michigan, New York, and Pennsylvania.



To prevent long distance artificial spread of the cereal leaf beetle, regulatory treatments are applied to selected commodities moving from infested to certain noninfested areas. Pictured is the fumigation of a truckload of hay being moved from a regulated area.

CITRUS BLACKFLY

An infestation of citrus blackfly was detected in a residential area of Brownsville, Tex., in April. Survey was immediately intensified, and 38,672 trees were examined. Eighty trees were found infested. Subsequently, a light infestation was detected throughout much of the city and in the village of Olmito, a few miles north of Brownsville. Federal and State emergency quarantine regulations were placed in effect and cooperative eradication measures initiated. The entire infested area and a suitable buffer zone are being treated with repeat applications of a systemic insecticide (dimethoate) at 21-day intervals. An aggregate of 196,720 citrus trees were treated in the Brownsville area. Ground equipment is utilized.

Program emphasis in northeastern Mexico is changing from a chemical control program to one utilizing an integrated approach. Citrus blackfly populations in northeastern Mexico were reduced to very low levels in 1971 through a combination of insecticides, dry weather, and parasites. Parasite colonization was begun in all infested areas of the State of Nuevo Leon. Immediately south of the Texas border, all infestations in the cities of Matamoros, Reynosa, and Valle Hermoso are being treated. Eradication is the objective in these areas.



Citrus covered with sooty-mold fungus which develops on honeydew excreted by the blackfly during the larval and pupal stages.

In Mexico, 6,449,725 trees were examined for the presence of citrus blackfly, and 199,999 trees were found infested. An aggregate of 463,996 citrus trees were treated.

Infrared photography, as a survey tool, has been made a part of the program in northeast Mexico. Tests conducted in the spring and summer of 1971 provided evidence that infrared photography will reveal infested trees that should be treated. By locating spot infestations and restricting the use of pesticides to those areas, there will be no drastic reduction in the parasite populations.

In other methods development tests, the systemic insecticide dimethoate proved to be more effective and less costly than carbophenothion. The systemic activity of dimethoate eliminates the necessity for complete coverage. It is being phased into the program in both Texas and Mexico.

EUROPEAN CHAFER

European chafer was detected in one new county, Lake County, Ohio, during the 1971 adult survey program. Spread in currently infested areas of Massachusetts, New York, and Pennsylvania was also recorded. Surveys of previously treated infested sites in western Massachusetts and in Providence, Rhode Island, were negative.

Granular chlordane was applied to 62 acres of turf at the Rochester-Monroe County Airport, Rochester, N.Y., and to 400 acres at the John F. Kennedy International Airport on Long Island to suppress chafer populations. These treatments are also effective against Japanese beetle. Carbaryl foliar sprays were applied at airports when necessary to reduce adult populations to preclude need for treatment of individual aircraft with micronized dusts.

Granular chlordane was used in the cooperative Federal-State control treatments on 141 acres in Ohio and 161 acres in the Boston, Mass., area. Both helicopter and ground equipment were used for application.

EUROPEAN CRANE FLY

The 1971 larval survey in Whatcom and Skagit Counties, Wash., indicated a southerly movement in Whatcom County 4 miles from the 1970 find. No larvae were found in Skagit County, although adults of both sexes were collected in that county at Mount Vernon during the 1969 and 1970 flight seasons. Adult female crane flies were collected in San Juan County, about 20 miles southwest of the infested area in Whatcom County.

The State of Washington revised its quarantine to be effective January 1, 1972, to regulate the western portion of Whatcom County between the Canadian border and the Skagit County line. Federal emergency regulations continued in effect pending a decision regarding the need for a Federal quarantine. Regulatory operations concentrated on the movement of soil, either independently or associated with plants, sod, or used soil-moving equipment.

Methods development and research studies in progress include: (1) Regulatory treatments; (2) study of improved survey techniques, including larval soil sampling and light trapping; and (3) cooperative investigations with Washington State University and the Entomology Research Division, Agricultural Research Service, in pesticide screening and attractant evaluation.

GIANT AFRICAN SNAIL

Although a new infestation comprising 11 properties was found on August 18, 1971, control of the original infestations in North Miami, Fla., has been very effective. The new infestation is located in North Miami in the general vicinity of the six previously detected infestations. By the end of 1971, only an occasional snail was being found. The overall number of properties requiring treatment had been reduced by more than half. The schedule for control measures had also been reduced. Bait applications were reduced from the 2-week interval to a 1-month interval. A second control technique, the use of carbaryl as a drench applied to the most likely snail habitats, was incorporated into the program.

An intensive program of property cleanup was initiated. All suitable snail locations were cleaned up to the extent possible. Homeowners cooperated in this phase of the program by removing leaves from under hedges, disposing of trash, pruning of plants, and sealing up vents underneath their houses. By applying these varied control measures, damage by the giant African snail has been eliminated. Of the 586 properties included at all infested sites, 466 have been released from treatment. A total of 275 properties was released from treatment in 1971. The objective of the program is eradication.



The giant African snail—objective eradication.

GOLDEN NEMATODE

Commercial potato fields continue to be kept free of golden nematode. During 1971, 317.3 acres were fumigated on Long Island. Vorlex was applied on 246.9 acres and dichloropropane-dichloropropene (D-D) on 70.4 acres. Surveys in Steuben County, N.Y., have revealed no new infestations in that area since June 1968. Intensive surveys are conducted each year to detect infestations on Long Island and in the Steuben County area. A biometric soil survey for golden nematode initiated in all commercial potato-growing areas of the country during the year. Work is continuing on the adaptation of the mechanical soil sampler for field use. Growers participated in the fumigation treatment of their fields for the first time in 1971.

Two resistant varieties of potatoes, Wauseon and Peconic, are available to growers. One of the growers in the 1971 treatment program on Long Island planted an entire field to a resistant variety. Several other growers planted these varieties to the known infested portions of the fumigated field. A third resistant variety, NY 41, is expected to be available to growers in 1975.



Grasshopper damage to corn in Oregon in August 1971.

GRASSHOPPER AND MORMON CRICKET

Adult grasshopper surveys made in the fall of 1970 indicated heavy infestations could occur during the 1971 season. Populations in Idaho and parts of Oregon and Washington reached unexpected proportions during June and July 1971. Infestations and damage to range grass and cropland can be compared only to those in the Midwest in the early forties and in the Western States in the early and late fifties.

Plans were made through rancher meetings conducted by Federal and State personnel to carry on a cooperative Federal-State-rancher program in 1971 where needed and requested. During the year, 873,038 acres were treated in five Western States using 8 ounces of ultralow-volume malathion per acre. Of this total, 747,000 acres were treated in Idaho of which about 341,000 acres were on private land. Control was generally good. In some areas of Idaho, grasshoppers moved into cropland from untreated range areas and caused severe damage.

The 1971 adult survey showed rangeland carried eight or more grasshoppers per square yard on 10,966,170 acres in 15 States. The States with the largest infested acreage were Colorado (900,000), Idaho (2,656,980), Oklahoma (1,903,000), Oregon (1,140,020), and Texas (2,819,880). Suspect areas will be kept under surveillance in the spring to determine where control work may be necessary.

Mormon cricket infestations continued at record low levels. In 1971, no control treatments were applied. The adult survey in 1971 indicated only scattered light infestations in Montana and Nevada.

GYPSY MOTH

During the 1971 survey conducted in 33 States, male moths were trapped for the first time in 58 counties in nine States and the District of Columbia. States involved were Alabama, Maryland, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Virginia, and Wisconsin. No egg masses were found at these positive trap sites. However, egg masses were found for the first time in New Castle County, Del., and in Cecil and Kent Counties, Md.

Cooperative aerial control programs were conducted in Jefferson County, N.Y., and Somerset County, Pa., on 5,140 acres. Continuing efforts to minimize artificial spread from campsites and mobile home parks called for aerial application of insecticide on 5,463 acres of woodlands. Additional acreage at these sites was treated with ground equipment. Carbaryl (Sevin 80S) was the principal insecticide used with some limited use of Sevin 4 Oil and Gardona.

A larval infestation in Pensacola, Fla., was treated with multiple applications of carbaryl. Subsequent trapping results were negative. This infestation was associated with a mobile home movement from the infested area in the Northeast.

Federal quarantine regulations were revised in January to extend the regulated area in New York and Pennsylvania and to place the entire State of New Jersey under regulation. Another revision in February deleted stone and quarry products from the list of exempted articles and required that movement of such articles from the regulated area must be accompanied by certificates or permits.

Due in a large measure to efforts of the National Gypsy Moth Advisory Council, an accelerated research and development program was initiated. Some of the elements under study are: Assessing and predicting populations and impacts; chemical and microbial insecticides; and parasites and predators, sterile male releases, and control tests with disparlure, the new synthetic attractant. A 5-year research and development program has been developed but it is expected that some items will become operational within 2 or 3 years.

The Methods Development Laboratory at Otis Air Force Base, Cape Cod, Mass., tested new formulations of *Bacillus thuringiensis*. A molasses formulation containing *Bt* in 1 gallon of total mix per acre performed as well as the insecticide standard. Aerial tests with this formulation are planned for 1972. Studies related to production of sterile male moths for control purposes are being strengthened.

Field tests were conducted in five States to evaluate the synthetic sex attractant disparlure for control purposes. Test data indicate that disparlure may be of value for control in areas of very light infestation. Additional tests are scheduled for 1972.

A total of 6,100,000 parasites, primarily the egg parasite *Ooencyrtus kuwanai*, was reared and released at many of the positive trap sites found in the detection program. Included in this total are 1,898,000 and 3,026,000 parasites produced by New Jersey and Pennsylvania respectively for their own releases. Cooperative agreements were established with New Jersey and Maryland to provide for parasite rearing capability. The New Jersey facility will provide parasites for use in other affected States under contract with Animal and Plant Health Inspection Service. Parasite rearing was phased out at the Otis laboratory.



Tiny parasitic wasps are used in the biological war against the gypsy moth. The pint carton shown here contained about 10,000 of the insects.

IMPORTED FIRE ANT

The 1971 control program was completed early in November. A major change this year was to reduce the number of applications and to apply mirex bait to only those areas where the ant is causing trouble, where property owners have requested relief, and where the State and local governmental agencies have requested Federal cooperation in a control program. Dense forested areas which are not ideal fire ant habitat, sensitive areas such as estuaries, and game refuges were not treated. Acreage treated during the calendar year totaled 6,901,483. The program was effective in controlling a high percentage of the mature fire ant mounds. However, a single treatment, particularly in the spring, is not always completely effective. Some spot retreatments and additional maintenance work will be necessary in these areas.

Field trials with a new latex bait formulation in which the amount of toxicant (mirex) was reduced showed promising results when compared with the standard bait formulation. With the new formulation, the amount of mirex required for control will be reduced from the present 1.7 grams to less than ½ gram per acre. It is planned to phase this new formulation into the program as soon as the necessary label clearances have been received and manufacturers can assure us of an adequate supply of the latex coated bait. It is expected that the ½-gram rate of application will further reduce the very low residues currently found in nontarget environment.

On March 18, 1971, the Environmental Protection Agency (EPA) determined that a substantial question of safety existed concerning the use of products containing mirex, and notice of cancellation of registration was issued. A scientific advisory committee was appointed to study the matter so that the questions could be aired and settled through administrative proceedings. The decision by the EPA administrator is expected in 1972.

JAPANESE BEETLE

The 1971 survey disclosed infestations in 35 new counties in eight partially infested States. Traps utilizing the new attractant, phenethyl propionate, were very effective for detection.

Cooperative control operations were conducted in six States to suppress populations at infested sites on the periphery of the infested area. This involved soil application of chlordane to 7,102 acres. In some instances, carbaryl foliar sprays were used against adult beetles.

Milky disease spore dust was applied to 2,352 acres at 14 airports in the continuing integrated control program to reduce beetle populations to low levels at sites that present a hazard of spread. In the chemical phase of this program, chlordane was applied to 1,398 acres of turf at six airports. Chlordane is used around high risk areas such as loading ramps, aircraft parking strips, and cargo storage areas. At Patuxent Naval Air Station, Md., 5,600 acres were aerially treated with carbaryl to reduce a heavy adult population. This action eliminated the need to treat a large number of aircraft destined for noninfested areas.

A biometrically designed larval survey correctly predicted a heavy adult beetle population at Dover Air Force Base, Del. The use of over 1,000 traps at the base, supplemented by carbaryl foliar sprays, was effective in suppressing the population and significantly reduced the need for treating individual aircraft.

Field tests determined that the effective range of the phenethyl propionate attractant is at least 1 mile. Tests with the attractant impregnated on cotton within a sealed, perforated metal container proved superior to the conventional glass bottle-cotton combination. The experimental containers retained attractancy for the entire survey season, were not subject to breakage, and eliminated the possibility, especially with children, of accidental ingestion of the liquid attractant.

The carbaryl formulation, Sevin 4 Oil, proved to be an extremely effective adulticide in field trials, and label registration will be sought.

KHAPRA BEETLE

No established khapra beetle infestations have been found in the United States since 1966. In 1971, 8,507 properties were inspected in the United States and Mexico with negative results. At east Mexico ports, 2,940,228 cubic feet of commodity and area fumigation was supervised following discoveries of khapra beetle infestations aboard foreign ships.

MEDITERRANEAN FRUIT FLY

Intensive detection surveys were concentrated in high hazard areas of the United States principally in Arizona, California, Florida, Louisiana, and southern Mexico. The objective of the program is immediate detection of any incursion of the pest into the continental United States or Mexico.

In calendar year 1971, 16,974 two-wick traps and 3,267 one-wick traps were used in the United States. These traps were placed at 27,128 different sites. In Mexico, 628 two-wick traps and 2,564 one-wick traps were used and placed at 3,453 sites.

No Mediterranean fruit flies were detected in the continental United States or Mexico in 1971.

The Entomology Research Division has increased the scope of their studies in Hawaii with the objective of determining the feasibility of eradicating Mediterranean fruit fly and other fruit flies from that State. Details of a proposed joint emergency action program in cooperation with Mexico are under consideration in the event of invasion of the fly from Central America.

MEXICAN FRUIT FLY

Detection surveys were continued in Arizona, California, Florida, Louisiana, Texas, and northwest Mexico with a food lure. There were 5,349 traps in operation in northern Mexico and southern Texas. Seven native flies were trapped in Tijuana and Ensenada, Baja California, Mexico. In July, 44 native flies were trapped at Las Paz, Baja California del Sur. Sterile releases were initiated, and no native flies have been trapped in this area since August. Over 16.5 million sterile flies were released in northwest Mexico in 1971.

Eight native flies were trapped in southern California. Sterile releases of 119,000 flies were made in this area. No larvae were detected which indicated continued protection for California.

In calendar year 1971, 4,550 fumigations involving 175.5 million pounds of citrus fruit and 1.9 million pounds of mangoes were certified by Plant Protection inspectors for shipment from Mexico to the United States and other countries. Shipments from south Texas required supervision of 98 fumigations.

ORIENTAL FRUIT FLY

The oriental fruit fly was again detected in California at Garden Grove, Orange County, on September 9, 1971. A single male fly was trapped. A second fly was detected on September 30 at Pacific Beach in San Diego County.

Immediately following detection, a project area was established using as its epicenter the catch site. From the epicenter the project area extended out 4½ miles in all directions comprising a total of 81 square miles. Traps were placed at the rate of five per square mile throughout the project area. Within each project area, a core zone was designated where treatments were applied. The core zone consisted of an area of 3 square miles extending out 1½ miles from the epicenter. After trapping for 2 weeks in the core zone for delimiting purposes, eradication treatments were begun. At 600 selected bait stations in each square mile of the core zone, four applications of a toxic lure bait consisting of methyl eugenol and naled plus a thickening agent were made at 2-week intervals. The bait applicator was an ordinary squirt-type oil can. The bait was applied at a rate of 3 to 5 ml. per bait station. At the completion of baiting, trapping continued in the project area until three fly generations had elapsed. No additional flies were caught.

PEACH MOSAIC

Federal involvement in the peach mosaic quarantine has been restricted to assisting the States with surveys of nurseries and budwood sites and in enforcement of uniform State quarantines. Since the incidence of the disease is so low as to be practically nonexistent, it has been most unusual in recent years to find any infection in or near any nurseries or budwood sites.

The cooperative Federal-State control program, coupled with control normally carried on by peach growers, has resulted in the disease incidence being reduced to a very low level. Federal funds have been used for survey and regulatory support. The objective of the program is to prevent the disease from becoming an economic problem.

In 1971, 882,853 trees were inspected in four States. A total of 66 trees was found infected in two States. Incidence of the diseased trees was 0.008 percent compared to 0.007 percent in 1970 and 0.003 percent in 1969. Infected trees were destroyed by growers.

PHONY PEACH

Federal involvement in this program is limited to assisting the States to enforce uniform State quarantine regulations through surveys of nurseries and budwood sites and survey to detect infected trees. Since Federal involvement began, the objective has been met by reducing and maintaining the incidence of the disease at noneconomic levels. In 1971, 3,939,030 trees were inspected in six States and 5,901 found infected. The disease incidence was 0.15 percent. The infected trees are destroyed by the growers. About 300 acres were treated with herbicides to destroy wild plum.

PINK BOLLWORM

The sterile release control program for pink bollworm was continued in the San Joaquin Valley of California in the summer of 1971. Approximately 108 million sterile moths were dropped into the area by aircraft from May 1 through November 11. The low level infestation which developed in the fall of 1969 and summer of 1970 has been contained by the technique. A total of 13 native adults and three larvae was found in Kern County in the San Joaquin Valley during 1970. In 1971, only three adult moths were found in Kern County. New finds of eight adults were reported in Tulare County and one in Fresno County, all north of Kern. No larvae were found. An intensive lure trapping program was conducted to monitor the area found infested in Kern County in 1970 and to detect any new finds outside the sterile release area.

Several modifications of pink bollworm rearing techniques are under test at Phoenix, Ariz. The current production procedures were essentially the same as in 1970 and the level of production about the same although some reduced production was encountered in midsummer.



Releasing sterile pink bollworm moths near Bakersfield in Kern County, Calif., and monitoring with traps using hexalure, a synthetic sex attractant.

A field trial was conducted in Nevada in 1971 and will be continued in 1972 using a 10 kilorad dose of irradiation for sterilization. This test is designed to measure the capability of moths irradiated at this lower dosage and to determine the overflooding ratio of sterile native moths necessary to control and possibly eradicate a native population. The irradiation dosage for moths released in the San Joaquin Valley in 1972 will be reduced from 25 to 20 kilorads. Some progress has been made toward stabilizing the natural sex lure which is more effective than the synthetic lure (hexalure) currently used on pink bollworm survey. Efforts to improve the effectiveness of hexalure continue.

RANGE CATERPILLAR

Field trials conducted in the past 2 years indicate that several insecticides show promise as a replacement for toxaphene for control of range caterpillar. Two of the materials, carbaryl and trichlorfon, have shown the greatest potential as chemical control agents, especially when used as oil formulations. These two materials were further tested on 1,280 acres for each insecticide in July 1971 in Union County, N.M. Preliminary results show that carbaryl gave 99 percent control after 21 days, and trichlorfon gave 94 percent control on one 640-acre plot and 86 percent on the second 640-acre plot after 7 days. The second plot received rain 7 hours after application. The bacterium, *Bacillus thuringiensis*, also looked promising in 1970 tests. Additional tests were conducted in Lincoln County, N.M., early in September 1971 in an attempt to develop *Bacillus thuringiensis* as a biological control.

Economic range caterpillar infestations in northeastern New Mexico were spotty, and control by the ranchers was minimal. No infestations were found in the area treated in 1970 by the ranchers.

The area in Lincoln County developed to economic importance after heavy rains came in mid-July. The ranchers treated about 275,000 acres using 1/2 pound toxaphene per acre.

SOYBEAN CYST NEMATODE

A new strain of soybean cyst nematode was discovered in northern Arkansas in 1968. It is capable of attacking the three resistant varieties, Pickett, Custer, and Dyer, that have the Peking source of resistance. This nematode is referred to as Race 4. By the end of 1970, it was widespread in most of the soybean-producing counties in the soybean cyst nematode quarantine areas of Arkansas, Missouri, and Tennessee. Researchers are working to develop a variety with resistance to Race 4.

In calendar year 1971, surveys were conducted in all major soybean-producing States. Over 248,000 acres were surveyed for symptoms, 15,640 soil samples were collected, and 42,440 new acres found infested. The pest was found in 10 new counties in seven of the 11 previously infested States and in one county in South Carolina. This was the first time the soybean cyst nematode was found in South Carolina. A total of 2,191,239 acres has been found infested from the beginning of the program through December 1971.

Regulatory services included certification of 6,686,742 bushels of seed beans and the treatment of 5,407 pieces of equipment.

SWEETPOTATO WEEVIL

Plant Protection and Quarantine Programs activities included survey of fields, storages, and transplant-growing areas. Uniform State quarantines are enforced by State personnel to prevent spread. In selected areas, volunteer wild hosts were destroyed with 2,4-D. The objective of the program is to prevent spread and eradication in areas of limited infestation.

In calendar year 1971, 2.03 million bushels of sweetpotatoes were examined and 63,369 acres surveyed. On 206 properties, 495 acres were found infested. Growers applied insecticides to 1,416 acres and used mechanical control on 22,252 acres.

The Louisiana State University is doing research on the development of a pheromone for trapping. A crude pheromone was tried by Plant Protection and Quarantine Programs personnel as a survey tool in several States in 1971. Louisiana State University is also working on alternate chemicals for the control of sweetpotato weevil.

WEST INDIAN SUGARCANE ROOT BORER

Following the third year of concentrated effort, gains of the program are becoming increasingly apparent. Overall populations have continued to decline. In the fall of 1971, 11 new lightly infested groves were found outside the regulated area. This brought the total number of acres found infested since the beginning of the program to 1,706. It was necessary to add 7,200 acres to the regulated area. The regulated area now totals 14,200 acres. In 1971, only 861 adult weevils were collected on 1,124 acres. The Plant Industry Division of the Florida Department of Agriculture and Consumer Services and Plant Protection and Quarantine Programs treated all new infested acres with soil insecticides. Foliage sprays were also applied to infested citrus groves as needed. A dry spring in central Florida in 1971 provided evidence of the seriousness of this pest. Damage to citrus trees resulting from larvae present in the soil prior to the beginning of the control program, coupled with the dry weather, caused serious decline symptoms or mortality in more than 1,600 trees.

A State quarantine regulates movement from the infested area of articles considered to be hazardous. The State was assisted in its enforcement by Plant Protection and Quarantine Programs inspectors. During the fruit shipping season, State or Federal inspectors were stationed at packing sheds to assure that no hitchhiking adult borers accompanied fruit movement and that leaves which could harbor eggs were removed and destroyed. The use of infrared photography on a trial basis for survey was introduced into the program this year. Initial results show promise for its use for detection.

WHITEFRINGED BEETLE

Infestations were found in 11 new counties in six currently infested States.

Granular chlordane or dieldrin was applied to 3,798 acres to control populations to reduce spread from outlying infested sites. Carbaryl foliar sprays were used against adult beetles to supplement soil treatments.

A revision of Federal quarantine regulations effective March 6, 1971, placed the entire State of Alabama under regulation. The revision extended the regulated area in most of the other quarantined States.

Preliminary studies of old research records at the regional office at Gulfport, Miss., were made as part of an investigation to further document the economic importance of the whitefringed beetle to certain crops. It is expected that the raw field data recorded for each of the important crops along with other variable factors can be worked into a computer program to provide measure of losses (within confidence limits) due to the beetle.

In Methods Development field tests, aerial application of Sevin 4 Oil at 1 pound (1 quart) undiluted insecticide per acre was not effective in controlling adult beetles. A plant dip treatment for certification of balled and burlapped nursery stock was developed using the insecticide Abate.

WITCHWEED

Through the enforcement of cooperative Federal-State quarantines and the application of control measures, witchweed has been confined to a relatively small portion of North Carolina and South Carolina. Surveys in 1971 revealed 143 additional farms with light witchweed infestations in previously infested counties. A county in North Carolina, previously declared free of witchweed and removed from regulation, was found with infestation this year. However, two additional counties in North Carolina and two additional counties in South Carolina were declared free of witchweed making a total of eight counties, four in North Carolina, and four in South Carolina, that have been removed from regulation.

Under a system of field inspections prior to treatment, it was possible during the 1971 control program to reduce the amount of 2,4-D used to control witchweed. This year, 20,000 fewer acres were treated than in 1970. This resulted in dollar savings and a reduction in the amount of the herbicide 2,4-D added to the environment. This procedure has been followed for the past 2 years successfully while maintaining a low incidence of infestation.

Three infested farms were chosen for an eradication test using herbicides. Fields that were in soybeans and cotton were treated with trifluralin; paraquat was used on corn and noncrop areas. In the second year of treatment, progress has been good with declining witchweed populations. There are still some small isolated witchweed infestations on all three farms; however, there is no evidence of any seed production. Equipment has been developed which enables layering of herbicides such as trifluralin in the soil around crops such as corn. This device also serves as an excellent tillage tool. Results of test plots indicate the technique may offer a possible eradication procedure for witchweed. It also offers a possible alternative which may be superior to the 2,4-D program presently in use for population suppression. Procedures have been started to obtain a patent for this equipment.

PEST MANAGEMENT

Pest management is the designation for a new cooperative Federal-State program which was initiated in 1972. The Animal and Plant Health Inspection Service cooperates with the extension service, State experiment station, and farmers in establishing and operating pilot study areas. The program is comprised of three major activities:

1. Scouting the study areas to furnish data for the State extension service and the farmer as a guide to the necessary pest control measures.
2. Developing and maintaining a computerized data collection procedure which is expected to be of great value in developing models of pest population development and predicting pest outbreaks.
3. Evaluating the ecological impact of pest control by monitoring in and outside the project areas.

During the 1971 season, pilot study areas were established on cotton in Arizona and on tobacco in North Carolina. About 1,700 farms were involved in the program. Evaluation of insect conditions was made available to the farmer and the county agents immediately. The data were then processed for computerization. This resulted in timely availability of results to the grower, summaries for use in program management and for extension purposes, and data for use in program evaluation. Baseline data on pesticide residues in environmental components were also collected.

The pilot pest management programs are demonstrating to growers that economic control of pest species can be accomplished by assessing field populations of both pests and beneficial species and by applying pesticides only as pest species reach economic threshold. This more proper use of pesticides results in lower production costs and minimizes the impact of these materials on the total environment.

INSECT SURVEY AND DETECTION

There were 43 States with cooperative survey agreements in 1971. Full-time survey entomologists are employed by 29 States. In addition, modified agreements contribute to a program in 14 States. Participation in the survey has shown marked improvement in recent years. This can be attributed largely to the mutually supported program. Summaries of insect conditions were received from 42 States for the calendar year 1971.

Most of our principal insect pests have been introduced into the country with a major pest showing up about every 2 years. The aim of the detection program is to discover these pests early and to report them promptly so that effective control or containment action can be taken.

Special detection surveys are conducted such as the light-trapping program carried on around major ports of entry. Two hundred and seventy blacklight traps were operated at 168 locations considered key entry points for foreign insect pest introductions. The military cooperated by providing personnel to service and submit weekly collections for identification from traps in operation on military bases. The detection work is supported by training workshops which are conducted periodically throughout the country. Two workshops were conducted in 1971 making a total of nearly 80 since 1960.

Fifteen species new to the United States were reported in 1971. Hawaii, the most vulnerable State to new introductions, recorded eight (seven were new Western Hemisphere records), New York one (a new Western Hemisphere record), Nebraska one, Oregon two, California two, and Virginia two. Perhaps the most important find was *Aculus comatus*, an eriophyid mite, collected on filberts in Oregon. These mites deform and russet leaves and fruits, blast buds, and, if uncontrolled, can cause loss of production. Researchers at Oregon State University are determining the extent of the infestation and developing control procedures. Eggs and larvae of a swallowtail butterfly, *Papilio xuthus*, were collected from citrus plants in Oahu, Hawaii. Larvae feed on leaves of *Citrus* spp., and can cause economic damage. Most of the remainder of the new introductions are beneficial or noneconomic. In addition, 71 new States records of pests which are still spreading through their ecological range were reported.



One of the 270 blacklight traps operated at key ports of entry to provide early detection of "foreign invaders."

Table 1--Barberry eradication--calendar year 1971

State	Survey and detection	Control		Regulatory
	Area surveyed	Plants destroyed	Area placed on maintenance	Nursery inspections
	<i>Square miles</i>	<i>Number</i>	<i>Square miles</i>	<i>Number</i>
Alabama	-----	-----	-----	36
Arkansas	-----	-----	-----	3
California	-----	-----	-----	68
Colorado	37	1,790	8	19
Connecticut	-----	-----	-----	29
Delaware	-----	-----	-----	16
Florida	-----	-----	-----	24
Georgia	-----	-----	-----	31
Illinois	54	44	60	35
Indiana	21	115	16	10
Iowa	137	1,522	132	18
Kansas	454	80	449	18
Kentucky	-----	-----	-----	17
Louisiana	-----	-----	-----	22
Maine	-----	-----	-----	50
Maryland	-----	-----	-----	28
Massachusetts	-----	-----	-----	21
Michigan	92	858	50	19
Minnesota	70	1,261	40	29
Mississippi	-----	-----	-----	19
Missouri	11	1	16	7
Montana	7	22	4	-----
Nebraska	43	1	25	1
New Hampshire	-----	-----	-----	12
New Jersey	-----	-----	-----	64
New York	-----	-----	-----	65
North Carolina	-----	-----	-----	37
Ohio	51	181	65	152
Oklahoma	-----	-----	-----	10
Oregon	-----	-----	-----	43
Pennsylvania	295	3,709	55	60
Rhode Island	-----	-----	-----	118
South Carolina	-----	-----	-----	13
South Dakota	2	-----	2	2
Tennessee	-----	-----	-----	109
Texas	-----	-----	-----	8
Utah	-----	-----	-----	5
Vermont	-----	-----	-----	18
Virginia	54	416,012	17	174
Washington	34	500	6	27
West Virginia	125	1,001,608	13	12
Wisconsin	77	260	55	7
Total	1,564	1,427,964	1,013	1,456

Table 2.--Boll weevil--calendar year 1971

United States and Mexico	Survey and detection	Control
	Area visually surveyed	Area treated
	<i>Acres</i>	<i>Acres¹</i>
Texas	858,584	379,761
Mexico	4,318	3,229
Total	862,902	382,990

¹ Aggregate acres.

Table 3.--Cereal leaf beetle--calendar year 1971

State	Survey and detection
	Area surveyed
	<i>Acres</i>
Alabama	2,750
Arkansas	7,317
Delaware	140
Florida	855
Georgia	1,835
Illinois	45,834
Indiana	377
Iowa	10,875
Louisiana	64
Maryland	3,938
Massachusetts	423
Minnesota	580
Mississippi	8,460
Missouri	4,687
New Jersey	1,461
North Carolina	5,159
Oklahoma	9,060
Rhode Island	25
South Carolina	5,871
Tennessee	15,701
Texas	2,291
Virginia	10,590
West Virginia	262
Wisconsin	9,960
Total	148,515

Table 4.--Citrus black fly--calendar year 1971

United States and Mexico	Survey and detection		Control
	Trees examined	Trees infested	Host plants treated
United States:	<i>Number</i>	<i>Number</i>	<i>Number</i>
Arizona	1,149	-----	-----
Texas	38,672	80	196,720
Mexico	¹ 6,449,725	199,999	463,996
Total	6,489,546	200,079	660,716

¹ Includes detection & delimiting.

Table 5.--European chafer--calendar year 1971

State	Survey and detection	Control	Regulatory	
	Sites trapped	Area treated	Area treated	Nursery and other inspections
	<i>Number</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i>
Connecticut	60	-----	32	27
Delaware	15	-----	-----	-----
Illinois	-----	-----	-----	34
Indiana	-----	-----	-----	6
Iowa	-----	-----	-----	6
Maine	56	-----	-----	4
Massachusetts	559	161	1	65
New Hampshire	27	-----	-----	-----
New Jersey	38	-----	-----	5
New York	390	-----	274	308
Ohio	148	141	-----	14
Pennsylvania	102	-----	-----	17
Rhode Island	34	-----	-----	-----
Vermont	8	-----	-----	5
Virginia	22	-----	-----	-----
West Viriinia	21	-----	-----	-----
Total	1,480	302	307	491

Table 6.--Golden nematode--calendar year 1971

State	Survey and detection		Control	Regulatory
	Area surveyed	Samples taken	Area fumigated	Potato grader inspections
	<i>Acres</i>	<i>Number</i>	<i>Acres</i>	<i>Number</i>
Alabama	35	32	-----	-----
Arizona	50	10	-----	-----
California	295	59	-----	-----
Colorado	375	73	-----	-----
Connecticut	50	10	-----	-----
Delaware	257	277	-----	-----
Florida	2,788	227	-----	-----
Idaho	515	103	-----	-----
Indiana	25	8	-----	-----
Maine	1,010	202	-----	-----
Maryland	5	1	-----	-----
Massachusetts	20	4	-----	-----
Michigan	315	63	-----	-----
Minnesota	825	165	-----	-----
Montana	35	7	-----	-----
Nebraska	-----	26	-----	-----
New Hampshire	125	37	-----	-----
New Jersey	185	60	-----	-----
New Mexico	5	1	-----	-----
New York	16,916	24,853	317	1,008
North Carolina	431	283	-----	-----
North Dakota	-----	174	-----	-----
Ohio	70	14	-----	-----
Oklahoma	46	11	-----	-----
Oregon	315	63	-----	-----
Pennsylvania	290	58	-----	-----
Rhode Island	171	20	-----	-----
South Carolina	122	32	-----	-----
Texas	-----	255	-----	-----
Utah	50	10	-----	-----
Vermont	700	78	-----	-----
Virginia	2,235	2,980	-----	-----
Washington	330	66	-----	-----
Wisconsin	410	82	-----	-----
Total	29,001	30,344	317	1,008

Table 7.--Grasshopper control--calendar year 1971

State	Survey and detection	Control
	Area infested ¹	Area treated
	<i>Acres</i>	<i>Acres</i>
Arizona	59,000	-----
California	117,920	24,192
Colorado	900,000	-----
Idaho	2,656,980	747,067
Montana	142,200	-----
Nevada	53,060	11,984
New Mexico	625,000	-----
North Dakota	12,000	-----
Oklahoma	1,903,000	73,355
Oregon	1,140,020	-----
South Dakota	17,700	-----
Texas	2,819,880	-----
Utah	35,530	-----
Washington	320,200	3,480
Wyoming	163,680	12,960
Total	10,966,170	873,038

¹ Adult survey, 1971.

Table 8.--Gypsy moth--calendar year 1971

State	Survey and detection	Control		Regulatory	
	Sites trapped	Area treated chemically	Parasites released ¹	Nursery and other inspections	Commodity treatments
	<i>Number</i>	<i>Acres</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Alabama	445	-----	20	19	2
Arizona	13	-----	-----	13	-----
Arkansas	193	-----	-----	10	-----
California	603	-----	-----	28	-----
Colorado	-----	-----	-----	4	-----
Connecticut	261	-----	-----	3,880	480
Delaware	1,111	-----	90	-----	-----
District of Columbia	75	-----	-----	-----	-----
Florida	697	320	50	223	3
Georgia	341	-----	-----	8	1
Hawaii	-----	-----	-----	1	-----
Idaho	-----	-----	-----	2	-----
Illinois	70	-----	-----	57	2
Indiana	77	-----	-----	52	4
Iowa	54	-----	-----	-----	-----
Kansas	-----	-----	-----	3	-----
Kentucky	102	-----	-----	22	-----
Louisiana	155	-----	-----	5	-----
Maine	552	-----	-----	1,074	818
Maryland	8,446	-----	348	28	-----
Massachusetts	110	-----	-----	725	40
Michigan	53	-----	-----	1	116
Minnesota	46	-----	-----	11	1
Mississippi	125	-----	-----	6	-----
Missouri	41	-----	-----	-----	-----
Nevada	-----	-----	-----	1	-----
New Hampshire	65	-----	-----	384	382
New Jersey	-----	-----	2,007	3,488	622
New Mexico	-----	-----	-----	1	-----
New York	5,865	4,960	120	2,956	1,168
North Carolina	1,117	-----	109	28	4
North Dakota	10	-----	-----	-----	-----
Ohio	646	-----	40	116	-----
Oklahoma	-----	-----	-----	3	-----
Oregon	100	-----	-----	1	-----
Pennsylvania	13,228	180	3,026	4,119	18
Rhode Island	100	-----	-----	978	9
South Carolina	362	-----	20	46	-----
South Dakota	4	-----	-----	-----	-----
Tennessee	362	-----	-----	6	-----
Texas	77	-----	-----	13	1
Utah	-----	-----	-----	1	-----
Vermont	792	3	-----	875	505
Virginia	6,396	-----	270	111	19
Washington	9	-----	-----	20	-----
West Virginia	2,502	-----	-----	10	-----
Wisconsin	77	-----	-----	18	1
Total	45,282	5,463	6,100	19,347	4,196

¹ Units of 1,000.

Table 9.--Imported fine art--calendar year 1971

State	Survey and detection	Control	Regulatory			
	Area surveyed ¹	Area treated	Nursery inspections	All other inspections	Commodity treatments	Pesticide treatments - 50:1
	<i>Acres</i>	<i>Acres</i> ²	Number	Number	Number	Acres
Alabama	964,681	52,747	3,591	1,335	177	3,918
Arkansas	2,474,364	12,000	5	-----	1	-----
Florida	43,038	-----	1,730	1,090	11	3,525
Georgia	9,351,758	3,958,256	584	507	324	759
Illinois	-----	-----	-----	34	-----	-----
Indiana	-----	-----	-----	6	-----	-----
Iowa	-----	-----	-----	6	-----	-----
Louisiana	2,635,080	15,938	1,449	539	33	2,126
Massachusetts	-----	-----	-----	2	-----	-----
Mississippi	7,883,387	2,640,276	845	1,761	751	419
North Carolina	1,247,926	651	39	311	47	8
Oklahoma	4,075	-----	-----	-----	-----	-----
South Carolina	4,303,424	221,565	75	794	65	66
Tennessee	681,086	-----	9	30	-----	-----
Texas	658,511	50	2,201	1,065	219	1,258
Virginia	5,777	-----	1	8	-----	-----
Total	30,253,107	6,901,483	10,529	7,488	1,628	12,079

¹ Includes detection, delimiting, and appraisal.

² Aggregate acres.

Table 10.--Japanese beetle--calendar year 1971

State	Survey and detection			Control	Regulatory	
	Area surveyed	Sites trapped	Area infested outside regulated area	Area treated chemically	Area treated soil	Commodity treatments
	<i>Acres</i>	<i>Number</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i>
Alabama	13,392	1,951	80	110	24	.....
Arizona	.....	42	.....	.....	.....	.....
Arkansas	.....	110	.....	.....	.....	.....
California	.....	4,320	.....	.....	.....	.....
Colorado	.....	95	.....	.....	.....	.....
Connecticut	161	.....	.....	.....	323	196
Delaware	10,240	1,135	.....	.....	.....	79
District of Columbia	.....	.....	.....	.....	.....	90
Florida	.....	108	.....	.....	.....	.....
Georgia	10,426	1,307	354,100	.....	311	24
Hawaii	.....	12	.....	.....	.....	.....
Idaho	.....	4	.....	.....	.....	.....
Illinois	130	4,285	75,240	228	4	4
Indiana	120	4,831	223,233	56	552	54
Iowa	.....	2,131	.....	.....	.....	.....
Kentucky	1,193	3,778	5,170	20	401	8
Louisiana	.....	162	.....	.....	.....	.....
Maine	7	631	.....	.....	5	34
Maryland	720	.....	.....	.....	11	3,627
Massachusetts	403	.....	.....	.....	21	114
Michigan	225	10,420	39,892	6,611	116	6
Minnesota	.....	1,145	.....	.....	.....	.....
Mississippi	.....	134	.....	.....	.....	.....
Missouri	63	1,935	.....	.....	.....	.....
Nebraska	.....	51	.....	.....	.....	.....
Nevada	.....	6	.....	.....	.....	.....
New Hampshire	.....	.....	.....	.....	.....	4
New Jersey	609	.....	.....	.....	468	112
New York	.....	.....	.....	.....	637	88
North Carolina	764	.....	.....	.....	663	1,481
North Dakota	.....	78	.....	.....	.....	.....
Ohio	2,530	4,348	201	77	610	725
Oklahoma	.....	40	.....	.....	.....	.....
Oregon	.....	225	.....	.....	.....	.....
Pennsylvania	219	.....	.....	.....	446	23
Rhode Island	35	.....	.....	.....	110	5
South Carolina	8,520	670	.....	.....	38	47
South Dakota	.....	163	.....	.....	.....	.....
Tennessee	3,697	2,077	117,460	.....	70	16
Texas	.....	88	.....	.....	.....	.....
Vermont	.....	.....	.....	.....	.....	1
Virginia	.....	.....	.....	.....	271	115
Washington	.....	61	.....	.....	.....	.....
West Virginia	.....	.....	.....	.....	.....	9
Wisconsin	.....	677	.....	.....	.....	.....
Total	53,454	47,020	815,376	7,102	5,081	6,862

Table 11.--Mexican fruit fly--calendar year 1971

United States and Mexico	Survey and detection		Control	Regulatory
	Traps installed	Area infested	Biological sterile flies released ¹	Commodity treatments
United States:	<i>Number</i>	<i>Acres</i>	<i>Number</i>	<i>Number</i>
Arizona	82	-----	-----	-----
California	2,078	-----	161	-----
Florida	375	-----	-----	-----
Louisiana	50	-----	-----	-----
Texas	3,033	43,442	-----	132
Mexico	1,060	-----	26,310	5,004
Total	6,678	43,442	26,471	5,136

¹ Units of 1000.

Table 12.--Peach mosaic--calendar year 1971

State	Survey and detection	Control	Regulatory
	Hosts examined	Trees removed	Nursery inspections
	<i>Number</i>	<i>Number</i>	<i>Number</i>
Arkansas	22,600	-----	3
Colorado	661,481	65	-----
Oklahoma	-----	-----	17
Texas	183,430	1	5
Utah	15,342	-----	-----
Total	882,853	66	25

Table 13.--Phony peach--calendar year 1971

State	Survey and detection		Control		Regulatory
	Hosts examined	Hosts positive	Area treated	Trees removed	Nursery sites approved
	<i>Number</i>	<i>Number</i>	<i>Acres</i>	<i>Number</i>	<i>Number</i>
Alabama	-----	-----	-----	-----	25
Arkansas	288,025	16	-----	16	-----
Georgia	1,972,095	4,602	42	4,602	-----
Louisiana	95,550	386	-----	386	-----
Mississippi	42,065	594	-----	980	-----
South Carolina	1,492,800	282	247	282	-----
Texas	48,495	21	-----	21	-----
Total	3,939,030	5,901	289	6,287	25

Table 14.--Pink bollworm--calendar year 1971

United States and Mexico	Survey and detection		Control	Regulatory
	Bloom-boll survey	Traps installed	Cultural control (growers)	Commodity treatments
United States:	<i>Acres</i>	<i>Number</i>	<i>Acres</i>	<i>Number</i>
Alabama	43	208	-----	-----
Arizona	20,319	151	207,021	237
Arkansas	-----	3,359	843,363	7
California	282,043	8,452	229,415	372
Florida	-----	196	-----	-----
Georgia	500	294	-----	-----
Illinois	-----	-----	-----	1
Kentucky	5,425	50	-----	-----
Louisiana	1	2,232	64,729	19
Massachusetts	-----	-----	-----	4
Mississippi	-----	1,926	-----	2
Missouri	-----	230	-----	-----
Nevada	-----	15	-----	1
New Mexico	1,000	20	-----	13
North Carolina	-----	100	-----	-----
Oklahoma	33	-----	-----	1
South Carolina	-----	369	-----	-----
Tennessee	145	1,275	-----	-----
Texas	51,253	20	1,083,122	442
Mexico	63,039	1,792	313,308	166
Total	423,801	20,689	2,740,958	1,265

Table 15.--Soybean cyst nematode--calendar year 1971

State	Survey and detection			Regulatory
	Area surveyed	Samples taken	Area infested	Commodity treatments
	<i>Acres</i>	<i>Number</i>	<i>Acres</i>	<i>Number</i>
Alabama	24,586	111	-----	-----
Arkansas	107,395	525	1,439	155
Delaware	-----	20	-----	-----
Florida	7,760	118	212	-----
Georgia	200	-----	-----	-----
Illinois	-----	709	147	-----
Indiana	5,011	1,255	2,562	-----
Kentucky	-----	772	3,592	13
Louisiana	9,412	2,128	22,345	121
Maryland	7	50	-----	-----
Mississippi	74,237	778	780	244
Missouri	9,845	2,733	40	31
Nebraska	-----	42	-----	-----
New Jersey	130	238	-----	-----
North Carolina	6,121	1,998	1,969	75
South Carolina	-----	-----	3	-----
Tennessee	3,145	141	7,234	270
Texas	885	-----	-----	-----
Virginia	150	4,022	2,117	7
Total	248,884	15,640	42,440	916

Table 16.--White-fringed beetles--calendar year 1971

State	Survey and detection		Control	Regulatory		
	Area surveyed	Area infested	Area treated ¹	Commodity treatments	Area treated	
					Soil	Foliage
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i>	<i>Acres</i>	<i>Acres</i>
Alabama	192,036	3,280	-----	247	6,497	18,776
Arkansas	6,799	270	1,665	6	40	-----
Delaware	133	-----	-----	-----	-----	-----
District of Columbia	94	-----	-----	-----	-----	-----
Florida	10,211	230	-----	4	1,051	99
Georgia	54,736	7,710	-----	8,918	692	62
Illinois	425	-----	-----	-----	-----	-----
Indiana	57	-----	-----	-----	-----	-----
Kentucky	4,288	12	275	-----	-----	-----
Louisiana	13,846	6,899	161	12	1,341	3,458
Maryland	1,296	-----	-----	-----	-----	-----
Mississippi	63,406	1,370	-----	917	395	1
Missouri	11,846	-----	251	-----	-----	-----
New Jersey	370	-----	-----	-----	-----	-----
North Carolina	18,218	7,364	91	397	555	7
Oklahoma	360	-----	-----	-----	-----	-----
South Carolina	24,013	130	1,157	34	19	-----
Tennessee	7,588	5,422	-----	587	481	502
Texas	5,876	628	1,740	2	10	-----
Virginia	16,200	1,234	40	245	248	116
West Virginia	1,206	-----	-----	-----	-----	-----
Total	433,004	34,549	5,380	11,369	11,329	23,021

¹ Includes soil and surface, and foliage.

Table 17.--Witchweed--calendar year 1971

State	Survey and detection		Control	Regulatory
	Area surveyed	Area infested	Area treated	Commodity treatments
	<i>Acres</i>	<i>Acres</i>	<i>Acres¹</i>	<i>Number</i>
Alabama	27,854	-----	-----	-----
Arkansas	2,973	-----	-----	-----
Delaware	90	-----	-----	-----
Florida	1,201	-----	-----	-----
Georgia	67,310	-----	-----	-----
Louisiana	5,020	-----	-----	-----
Maryland	64	-----	-----	-----
Mississippi	18,162	-----	-----	-----
New Jersey	660	-----	-----	-----
New York	45	-----	-----	-----
North Carolina	236,481	7,029	315,528	3,052
Oklahoma	1,880	-----	-----	-----
Pennsylvania	172	-----	-----	-----
South Carolina	155,483	2,436	53,240	1,372
Tennessee	10,560	-----	-----	-----
Texas	260	-----	-----	-----
Virginia	10,578	-----	-----	-----
West Virginia	2,931	-----	-----	-----
Total	541,724	9,465	368,768	4,424

¹ Aggregate acres.

